

REMARKS

I. Priority

The present application claims the priority of Russian Application No. 2002130193. A **certified copy** of Russian Application No. 2002130193, filed on November 11, 2002, is enclosed with this response.

Also enclosed with this paper is a Statement of Translation by Svetlana Z. Short who is fluent in both the Russian and English languages, certifying that the translation upon which the present application is base is an accurate translation of Russian Application No. 2002130193.

II. Drawings

Applicants note with appreciation the Examiner's acceptance of the drawing submitted with the application.

III. Claims

Claims 1-12 remain in the application. Claims 1 and 4 are the independent claims. Claims 2-3 depend on claim 1. Claims 5-12 depend on claim 4.

Claims 1, 4, 8 and 9 have been amended as follows to correct informalities pointed our by the Examiner. The lines referred to below are those in the attached set of claims and the counting begins with the first line of each claim. Specifically:

Claim 1, line 10, the phrase "so that" has been deleted.

Claim 4, line 10, the phrase "the said and second" has been amended to read --the first and second--; and the phrase "so that" has been deleted from lines 10-11 and 13.

Claim 8, line 2, the phrase "equal, less or greater than" has been amended to read --equal to, less than or greater than--.

Claim 9, line 2, the phrase "equal, less or greater than" has been amended to read --equal to, less than or greater than--.

IV. Abstract of the Invention

Applicants note the Examiners comment that the Abstract is longer than 150 words. An amended Abstract is submitted as part of this Response

V. Claim Objections

Claims 1,4,8 and 9 are objected due to informalities as noted in the Office Action. Amendments have been made to correct these informalities as are described above in **Section III.**

VI. Claim Rejections - 35 U.S.C. §102

A. U.S. Patent No. US 6,856,737 to Parker et al.

Claims 1 and 8 are rejected under 5 U.S.C. §102 as being anticipated by US 6,856,737 to Parker et al. for reasons set forth in the Office Action. Applicants' traverse the rejection on the grounds that the Parker patent is not prior art to the present application.

The ribboned copy of the parent Russian Application establishes that the present application was filed on November 11, 2002. The application that resulted in the Parker et al. patent was first-filed on August 27, 2003, with no claim of priority to any earlier application. This date is approximately eight (8) month after the filing date of the present application. Consequently, applicants' submit that the Parker et al patent is not prior art to the present application.

Therefore, applicants respectfully submit that it is proper for the Examiner to withdraw the Parker et al. patent as prior art to the present application in view of the fact that it was first-filed after the priority date of the present application.

B. U.S. Patent No 6,901,194 to Charlton et al.

Claims 4, 5 and 7-12 are rejected under 5 U.S.C. §102 as being anticipated by US 6,901,194 to Charlton. Applicants traverse the rejection.

Regarding claim 4, the independent claim of this group of claims, the Examiner states that Charlton discloses a dispersion element (see Fig. 9a for the planar waveguide structure and Figures 44a and 44b for the photonic crystal structure) for a laser pulse compression device adapted to compress phase-modulated pulse wherein

- the dispersion element is based on a planar photonic crystal structure (the holes, 91, define the photonic crystal structure, as seen Figure 9a from the side, and in Figures 44a and 44b from the top) made as a two-dimensional periodic structure with predetermined period a , formed in a layer of high index material (core, 92) having a predetermined thickness and refractive index n_2 ,
- the high index material layer being deposited on a substrate (90) with a refractive index n_1 , at $n_2 > n_1$, (see column 14, lines 10-29)
- sites of the 2D periodic structure having first holes (441) of a predetermined equal size, forming columns, and
- second holes (442, 443) of a predetermined equal size different from that of the first holes, forming a predetermined number of adjacent columns,
- wherein the sizes of the first and second holes and the refractive indices are defined to provide guided propagation of the phase-modulated pulse in single-mode operation along the columns of the second holes in the structure, and
- a length of the dispersion element is defined to provide maximum compression of the phase-modulated pulse (see column 30, lines 41-56).

Applicants' claim 4 is directed to a dispersion element adapted to compress a phase-modulated pulse. While Charlton discloses planar photonic structures that seem on their surface to be similar to those of the claimed invention, applicants do not find anything within Charlton which describes a dispersion element for compression of a phase-modulated (chirped) pulse. Charlton's Figure 9 describes a photonic band

gap waveguide (Column 14, lines 10-37) in which holes are etched to reduce the effective index of refraction. However, nothing is mentioned concerning compression of a phase-modulated pulse. Charlton's device of Figures 44a and 44b likewise, on their surface, seem to be similar to those claimed invention. However, the structures of Figures 44a and 44bare used to reduce back-reflection as indicated in column 30, lines 40. Once again, nothing is mentioned concerning compression of a phase-modulated (chirped) pulse.

Therefore, in view of the fact that Charlton fails to mention dispersion devices for compression of a phase-modulated pulse, applicants respectively submit that Charlton doe not anticipate the claimed invention as claimed in claim 4.

Regarding claim 7, Applicants traverse the rejection. Applicants agree that the laws of nature are not patentable and applicants are not seeking to patent the equation itself that is given in claim 7. The equation is used to enable one seeking to practice the invention to determine the length of the dispersion element so that maximum compression of the phase-modulated pulse is achieved. This is a completely different item from seeking to patent an equation itself. Further, application of the equation to the specific situations described and claimed by the [present invention is not straightforward. Evaluation of the parameters of the equation requires sophisticated professional modeling of the dispersion characteristics of the structures under discussion — which is provided by the present application, for example, on page 9, line 9, to page 11, line 7, including the examples.

Regarding the rejection of claims 5, 8-12, applicants submit that these claims are patentable for depending on a patentable base claims.

VII. Claim Rejections: 35 U.S.C. §103

A. §103(a) Rejection of Claims 1-3 over US 2003/0053733 in view of Koroteev et al.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0053733 (Wang) in view of Koroteev et al. "Compression of ultrashort light pulses in photonic crystals". Specifically, the Examiner argues that given the suggestion of Koroteev to use a one-dimensional photonic band gap ("PBG") structure to maximally compress laser pulses by forming the PBG structure with a length given

by equation A1.11, one skilled in the art would have found it obvious to form the one-dimensional PBG structure disclosed by Wang to obtain maximal compression of laser pulses. Applicants traverse the rejection.

The application of the general physical laws described by Koroteev in the one-dimensional case to one-dimensional devices is not a straightforward operation as witnessed by applicants' specification on page 9, line 9, to page 11, line 7. One of "ordinary skill in the art" would not apply Koroteev's equation A1.11 to the specific situation described in the present application. Making the planar photonic dispersion compensation devices of the invention requires considerable sophisticated modeling of the structures under discussion. Applicants have provided this information and examples of planar photonic devices resulting from their modeling. In addition, since Wang does not indicate that the dispersion element is for a laser pulse compression device adapted to compress a phase-modulated pulse or that the length of the dispersion element is defined to provide maximum compression of the phase-modulated pulse, applicants submit that there is no teaching or suggestion that would lead one to combine Wang and Koroteev. Thus, neither the Wang nor the Koroteev art teaches or suggest any combination that would lead one to the devices described in the present application.

B. §103(a) Rejection of Claims 4, 6 and 7 over US 2003/0053733 in view of Koroteev et al. and Charlton et al.

Claims 4, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0053733 (Wang) in view of Koroteev et al. "Compression of ultrashort light pulses in photonic crystals: and Charlton et al, U.S. 6,901,194 for reasons set forth in the Office Action from page 10, line 2 to page 13, line 2. Applicants traverse the rejection.

The Examiner admits: Wang does not state that the dispersion element is for a laser pulse compression device adapted to compress a phase-modulated pulse; that a length of the dispersion element is defined to provide maximum compression; that sited of the 2D periodic holes have columns first and second holes of equal though different predetermined sizes, and that the sizes of the first and second holes and the

refractive indices are defined to provide guided propagation of the phase-modulated pulse in single-mode operation along the columns of the second holes in the structure. The examiner then look to Charlton to provide for holes of different sizes in columns and to Koroteev for teaching that photonic band gap structures may be used to compress laser pulses.

As applicants have carefully explained in their specification on page 9, line 9, to page 11, line 7, making the planar photonic dispersion compensation devices of the invention requires considerable sophisticated modeling of the structures under discussion. One of "ordinary skill in the art" would not apply Koroteev's equation A1.11 to the specific situation described in the present application. Applicants have provided the necessary information and examples of planar photonic devices resulting from their modeling. In addition, since Wang does not indicate that the dispersion element is for a laser pulse compression device adapted to compress a phase-modulated pulse or that the length of the dispersion element is defined to provide maximum compression of the phase-modulated pulse, applicants submit that there is no teaching or suggestion that would lead one to combine Wang with Charlton and Koroteev. Absent such teach or suggestion, the combination cannot be deemed to teach or suggest the claims invention, particularly in view of the sophisticated modeling that is required, modeling that

VIII. Conclusion

Based upon the above amendments, remarks, and papers of record, applicants believe the pending claims of the above-captioned application are in allowable form and patentable over the prior art of record. Applicants respectfully request reconsideration of the pending claims, 1-12 and a prompt Notice of Allowance thereon.

Applicants believe that no extension of time is necessary to make this Response timely. Should Applicants be in error, Applicants respectfully request the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Response timely, and hereby authorizes the Office to charge any necessary fee or surcharge with respect to said

Applicaton No. 10/695,960
Response Dated: March 13, 2006
In Response to Office Action of December 13, 2005

time extension to the deposit account of the undersigned firm of attorneys, Deposit Account
03-3325.

Please direct any questions or comments to Walter M. Douglas at (607) 974-2431.

<u>13 March 2006</u> Date	
CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. § 1.8	
I hereby certify that this paper and any papers referred to herein are being transmitted by US Mail to the U.S. Patent and Trademark Office at P.O. Box 1450, Alexandria, VA 22313- 1450 on:	
<u>13 March 2006</u> Date	
<u>Walter M. Douglas</u> Walter M. Douglas	<u>13 March 2006</u> Date

Respectfully submitted,
CORNING INCORPORATED

Walter M. Douglas
Walter M. Douglas
Registration No. 34,510
Corning Incorporated
Patent Department
Mail Stop SP-TI-03-1
Corning, NY 14831